APPENDIX B

Assessing Vision/ Low Vision

This appendix contains a list of visual impairments and a discussion of procedures for assessment of functional vision and for assessment by a qualified eye specialist. Samples of the following forms also appear: "Registration of Visually Handicapped Students," "Eye Report for Children with Visual Problems," "Preferred Visual Acuity Notations," "Educationally Oriented Vision Report," and a "Functional Vision Assessment Checklist Summary."

Visual Impairments

The list of visual impairments in this appendix is by no means meant to be complete or all-inclusive. Rather, it is presented as an example of the range of visual impairments that may be encountered. Many of the visual impairments listed may be congenital or acquired. The educational implications of the eye condition are an important factor in determining needs. Interaction of the teacher of the visually impaired, the eye specialist, and the student's physician is essential in assessing and meeting the visually impaired student's unique educational needs in this area.

Common visual impairments are described below:[1]

1. Irregularities of the optical media (e.g., cornea, lens, aqueous and vitreous humors), such as keratoconus or irregular astigmatism, cause either a distortion of the visual image or photophobia or both and may cause monocular diplopia.
2. Opacities, such as cataracts, corneal scarring, or vitreous turbidity, may cause light deprivation, glare or scattering, loss of contrast, impaired color perception, diminished central visual acuity, or monocular diplopia.
3. Defects of the iris and pupil include aniridia, polycoria (either developmental or traumatic), fixed pupil, and lack of pigmentation (as in albinism). These conditions may cause photophobia, monocular diplopia, or degradation of central vision.

[1] Definitions of the terms describing visual impairments appear in the glossary.

4. Defects of color vision (loss of central cones) may cause inaccurate or total loss of color perception and diminished central visual acuity.
5. Defects of rod (peripheral) vision may cause reduced or total inability to adapt to low levels of illumination or complete or partial loss in peripheral vision or both.
6. Defects of the optic nerve pathways or occipital cortex may cause a loss of central vision, color vision defects, or loss in peripheral vision, including scotomata, quadrantanopsia, or hemianopsia. These defects may affect one or both eyes, depending on the site of the defect, and may or may not be symmetrical between the two eyes.
7. Other types of vision loss due to intraocular origin include juvenile retinoschisis, retinal detachment, choroiditis, or glaucoma. These types of pathology cause a loss in visual field or diminished central or peripheral vision.
8. Systemic diseases have numerous ocular manifestations that are as varied as the disease entities themselves. Types of systemic diseases with ocular manifestations are diabetes, multiple sclerosis, vascular disease, and hydrocephalus.
9. Post inflammatory retinal scarring may result from infections and treatment of tumors.

Functional Vision Assessment

Students with a visual impairment need to learn to use their remaining vision as efficiently as possible. This refers to the relative ease and speed with which a particular student is able to use his or her vision to access instruction and instructional materials and to interpret environmental cues for safe orientation and mobility in a variety of settings. To meet this need, the teacher of the visually impaired, in conjunction with the orientation and mobility specialist, should evaluate how the student uses his or her vision to function within a variety of settings and situations which include the school, home, and community. Information from eye specialists and the family can also provide valuable information about the student's use of vision. The functional vision assessment is one criterion that is used in determining the appropriate reading medium or media for functionally blind students who have the ability to read. (See Appendix F, "Legal Requirements," and Appendix C, "Determining the Appropriate Reading Medium.")

The goals of the functional vision assessment are to:

- Identify apparent vision-related needs which result from the vision impairment.
- Provide information about necessary interventions or compensations (e.g., adaptations to materials or specialized instructional methods and modifications) that will enable the student with a visual impairment to function as independently as possible, and with maximum efficiency, within the school, home, and community. (Refer to the discussion of low vision in Chapter 3.)

Areas that are a part of a functional vision assessment include the following considerations, many of which are of interest to teachers of the visually impaired and to orientation and mobility specialists. (Evaluation of the student's use of remaining vision as it relates to orientation and mobility in the student's environments should be conducted by the orientation and mobility specialist.)

- Recognition of illumination: overhead lighting, body level, windows, and artificial lighting
- Gross object recognition: shape, size, location, and distance
- Fine detail discrimination and recognition (near and distance): objects (clock, flag, carts, and so forth); people; letters of name and numbers on doors, books, typewriter or computer, telephone, play and leisure items, wall displays, chalkboard or dry-erase board, or overhead transparencies; or video or television programs
- Contrast recognition: objects or print that are dark or light against a contrasting background (e.g., furniture, visual displays, landmarks, or pavement)
- Print recognition: print in text (type size, type style, or proximity of letters, words, or sentences); in reference material (newspaper, dictionary, encyclopedia, magazine, maps, and charts); print quality and contrast (color of print and paper, light or dark, and sharp or faded); print on chalkboard or dry-erase board (contrast required, color, or glare); and print on signs or outdoor buildings
- Color recognition: floor, wall, objects, chalkboard or dry-erase board, overhead or dry-erase markers, maps, charts, graphs, clothing, drawing tools (crayons, paint, or colored pencils), streets, landmarks, buildings, curbs, sidewalks, signs, traffic markings, and so forth
- Depth perception: ascending stairs, descending stairs, drop-offs, and step-ups; inclines and declines; floor

strips and threshold; reaching (eye-hand coordination); and so forth
- Learner in motion: line of travel; confidence; ability to locate doors and windows; recognition of intersecting hallways; travel through open doors; recognition of stairs, depth change, color and changes in contrast; and avoidance of people, overhangs, low objects, and objects at side
- Use of low vision aids such as specialized paper, pens, reading stands, near and/or distance devices (magnifiers or monoculars or both)

Given this assessment data and information from the "Eye Report for Children with Visual Problems," those conducting the assessment can use a functional vision checklist summary sheet, such as the one that appears in this appendix, to record findings and make recommendations. For students with low incidence disabilities, one of which is visual impairments, this report is to include the need for specialized books, materials, and equipment. (See Appendix F, "Legal Requirements.")

From this assessment information the teacher of the visually impaired and the orientation and mobility specialist will be able to provide specialized materials and strategies that enable or enhance a student's access to instruction and the environment and teach the student to maximize the functional use of vision in a variety of settings. Specialized instruction in adaptations for indoor or outdoor settings may include:

- Control of lighting and glare factors
- Preferred field of view and best gaze posture (eccentric viewing)
- Advantageous positioning of materials to maximize field of view and postural comfort
- Adaptations for reading and reading materials, such as print size, use of color, fatigue factors, time adjustments, and assignment modification
- Use of alternative learning media, such as large print, braille, raised line representation, and aural media (tape, reader, or voiced technology)
- Use of specialized access skills, such as visual or tactual scanning for efficient localization of designated material or previewing of printed or raised line or both
- Use of optical low vision aids, for near and distance viewing (e.g., magnifiers and monoculars)
- Use of nonoptical low vision aids, such as specialized paper, reading stands, and so forth
- Training in the use of specialized equipment and technology, such as braillewriter, electronic note-taking devices, print or braille printer, talking calculator and dictionary, reading machine, and closed-circuit television

Functional Vision Assessment of Preschool Children

It is important to use age-appropriate activities and materials when the functional vision assessment of a preschool-age child (three to five years old) is being conducted. Much relevant information about vision-related functioning and apparent vision-related needs can be derived from observation of the child while he or she interacts with toys, household materials, and other items and while he or she moves about in different environments.

To get meaningful information about nonreaders' use of functional vision, use objects, shapes, and pictures of shapes and common objects. Vary the size, contrast, distance presented, and so forth to get an idea of current and potential use of vision and of vision-related needs. This information will be helpful in determining the appropriate reading medium. This decision becomes increasingly important and receives greater focus as the transition from preschool to formal education approaches. (See Appendix C, "Determining the Appropriate Reading Medium.")

The following suggestions are intended to assist teachers of the visually impaired and orientation and mobility specialists with the functional vision assessment of preschoolers:

1. Observe how the child typically becomes oriented to objects. Does he or she use visual, tactual, auditory, or olfactory senses?
2. Note the child's apparent ease and speed in visual orientation to objects and to small parts of them. Does the child seem to quickly notice and/or reach for a pictured detail or part to manipulate?
3. Is eye-hand coordination (e.g., precise aim) demonstrated in the child's grasp of, and/or manipulation of, small parts or use of items which fit together?
4. Observe how the child typically becomes oriented to pictured material. Does the child notice, point to, or name pictured shapes, single objects, pictured activity, numbers, letters, and so forth? Notice the size, amount of detail, contrast, and so forth.
5. Note the child's apparent ease, speed, and stamina in attention to or in the recognition of objects and pictorial materials.

6. Does the child appear to "work" at seeing? Is recognition slow and laborious, or is it accomplished with apparent ease and at reasonable speed? Note the child's posture and the position of materials.
7. Does the child seem to show a preference for looking or touching or both?
8. Observe the distance, background, and size of objects detected or picked up or both from a table, floor, shelf, and so forth.
9. Observe the child's head position and distance, as well as factors of contrast and quality, with the child's attempts at using scissors to cut paper or at using writing utensils (for coloring, tracing, and so forth.)
10. Note how the child moves about the home, school, and/or community environments. What cues are noticed and responded to—visual, tactual, auditory, or olfactory?
11. How does the child become oriented to and move about within familiar and unfamiliar surroundings? Is movement accomplished safely and with apparent ease and speed?
12. Note environmental factors, such as lighting, contrast, and texture cues, that the child appears to be aware of or respond to or both. What does the child avoid or detect or both as he or she moves about?

Assessment by a Qualified Eye Specialist

An assessment by a fully qualified eye specialist should be performed to provide an understanding of the nature and extent of visual loss present. The following is a summary of the items needed in the eye specialist's report:

Detailed Case History

A detailed case history should include the following:

- Exploration of the etiology of vision loss, age at onset
- "Historical landmarks" in the disease process
- Eye preference
- Patient's present visual abilities and deficits
- Patient's visual rehabilitative desires
- Patient's concept of his or her goals (vocational, avocational, recreational, educational, daily living, and so forth)
- Past and present medical history
- Significant family medical history
- Patient's evaluation of environmental effects on vision (e.g., lighting)
- Stability of patient's vision (any recent changes)
- History of patient's use of visual or nonvisual aids
- Patient's motivation
- Patient's attitude

Visual Acuity Measurements

Distance visual acuity. Measure patient's distance vision with and without present correction(s) at a distance of ten feet. This distance may need to be shortened in cases of severe vision loss. If distance low vision aids are used, an assessment of visual acuity and efficiency in the use of an aid should be performed. An assessment of illumination effects should also be done.

Near visual acuity. Patient's near visual acuity should be measured with and without present correction at the reading distance the patient chooses. Acuity should be recorded, as well as the working distance. Testing with any low vision aids the patient has, as well as the effects of illumination, should be evaluated. If vocational aids are used, a measure of their acuity and efficiency should be done at the required working distance of the aid.

External Examination

An evaluation of the ability of the eyes to track together and maintain fixation should be performed. The areas involved in an external examination are discussed in the paragraphs that follow.

Evaluation of extraocular motility. If strabismus is present, it should be measured. Check for the patient's head tilt or rotation. If nystagmus is present, determine whether a change in amplitude occurs with a change in the direction of the patient's gaze or whether a latent component exists.

Pupillary reflexes. These can be used to rule out neurological problems or to detect strabismus; e.g., the Hirschberg Test. An estimation of the pupil's symmetry, size, shape, and position relative to the center of the cornea can be made. Transillumination of the iris should be performed to detect the degree of iris pigmentation present.

Color and stereopsis testing. Testing of color perception is the measurement of the eye's ability to discriminate various hues of color. Color perception can be tested using color plates and/or a Farnsworth type of test. Stereopsis can be evaluated with a polaroid test. If no stereopsis is present, gross fusion can be tested by anaglyph methods (e.g., the Worth Test). Patients should be allowed to hold the test at their best near working distance.

Keratometry. Keratometry is a measurement of curvature on the anterior surface of the cornea.

Retinoscopy. Retinoscopy is a method of objectively measuring refractive error by shining a light through the pupil and neutralizing its reflex with lenses.

Subjective Testing

Subjective testing is a method of measuring refractive error by evaluating a patient's response to changes in lens power. A trial frame and trial lenses should be used, rather than the refractor, to allow for eye or head movements. Testing by the "Just Noticeable Difference" (JND) method and a hand-held crossed cylinder should be done at a comfortable viewing distance for the patient. For patients with strong prescriptions, an overrefraction may be performed with the use of Halberg Clips or similar devices. Visual acuity should be measured at the conclusion of the refraction, and testing of the effect of illumination on distance vision should be performed.

With the best distance refraction in place, testing with various powered spectacle-mounted telescopes and handheld monoculars should be performed. Monocular stands can also be evaluated. A refinement of the trial frame refraction should also be performed with a telescope in place.

Near-vision testing is performed after distance-vision testing is concluded. A reasonable starting point would be to calculate the reciprocal of vision to determine the approximate amount of magnification required. Starting with this amount of magnification, various powered lenses are evaluated to provide relative distance magnification. For patients with a severe vision loss, microscopic lenses are also evaluated. Hand and stand magnifiers, loupes, closed-circuit television, reading stands, illumination devices, and so forth are analyzed. If specific working distances are required, telemicroscopes, surgical telescopes, or alternative systems may be needed. Acuity should be measured with single and multiple digit print, as well as with the patient's desired reading material.

Testing with an artificial iris or pupil contact lenses for patients with albinism or those bothered by glare should be performed. Specially designed filters should be evaluated. Various density and colored tints should be evaluated for both indoor and outdoor use. Visors and single or multiple pinholes should also be considered, as well as devices to provide an increase in illumination.

Visual field defects can be ameliorated by the use of field expanders (hand-held or spectacle-mounted), Fresnel prisms, or hemianopic mirrors.

Patients with high refractive errors or nystagmus should be evaluated with contact lenses to determine whether a better visual result can be obtained. Patients with scarred or irregular corneal surfaces may benefit from contact lens fit or minification, or contact lenses may be used as a light-filtering apparatus. Contact lenses may also be used to provide magnification to transmit selectively particular wavelengths of light.

Objective Testing

The following are means of objective testing:

- Biomicroscopy and tonometry
- Ophthalmoscopy
- Visual field assessment—Central defects may be charted on an Amsler Grid or tangent screen, with a large fixation cross present. Peripheral fields are best assessed on an arc perimeter or "bowl-type" visual field-testing instrument.

Considerations in Prescribing Low Vision Aids

The following are to be considered by those prescribing low vision aids:

- Patient's goals, desires, and needs
- Working distances required
- Illumination requirements
- Field of view needed
- Age of patient
- Multiple aids
- Stability of vision
- Performance with various aids tested

Supplementary Low Vision Services and Needs

The following are supplementary low vision needs to be considered:

- Training of the patient in the use of low vision aids
- Monitoring of the patient for a change in visual status

State Department of Education
Form #SE-04

Registration of Visually Handicapped Students

Check one: ☐ Public school ☐ Nonpublic school

Give code numbers from the California Public School Directory *or from the* California Private School Directory.

Name of the school district, office of the county superintendent of schools, or nonpublic school

Street address *City* *ZIP* *County*

Name of authorized officer *Title*

Address, if different from the central office ( ) *Telephone number*

Date

Total number of legally blind students reported: _____

Total number of partially sighted students reported: _____

I certify that information contained in this registration is based on current eye report forms retained by this office. To establish eligibility for the American Printing House for the Blind Federal Quota Program, I further certify that this school system has filed with the Department of Education an Assurance of Compliance Statement, based on the Civil Rights Act of 1964.

Signature of Authorized Officer

Educationally Oriented Vision Report

(To be completed by the eye specialist)

Date: Month Day Year *Student's name: Last First Middle*

The following information would be helpful in determining educational programming based on the needs of the student. We would appreciate your completing this form in addition to the "Eye Report for Children with Visual Problems."

1. What is the cause of the visual impairment?

2. Is any special treatment required? If so, what is the general nature of the treatment?

3. Is the visual impairment likely to get worse, better, or stay the same?

4. What symptoms would indicate a need for reexamination?

5. Should any restrictions be placed on the student's activities?

6. Should the student wear glasses or contact lenses? If so, under what circumstances?

7. If it was not possible to do a visual acuity measure, what is your opinion regarding what the student sees?

8. Are the student's focusing ability, tracking, and eye muscle balance adequate? If not, please describe:

9. If the student's visual field was not testable, what is your opinion regarding this student's field of vision?

10. Please describe the object size and distances that are optimal for the student:

11. What lighting conditions would be optimal for the student's visual functioning?

12. Do you have any additional specific recommendations concerning this student's use of vision in learning situations?

13. When should this student be examined again?

14. Additional comments and recommendations:

Please return this form to:

Functional Vision Assessment Checklist Summary

Date: Student's name:

Age: Grade: School/Placement:

Teacher of the visually impaired:

Reason for assessment: ☐ New referral ☐ Triennial review ☐ Request Other:

Nature/Extent of Visual Impairment

Diagnosis: Prognosis (Stability):

Acuity (Best corrected, each eye): Near: Distance:

Preferred eye: ☐ Right ☐ Left Student is or is not binocular:

Field of view: Preferred posture for viewing (If any):

Sensitivity to light/glare: Intervention (e.g., visor, glasses, or seating):

Other:

Describe current prescription and indicated use (glasses, bifocals, and so forth):

Educational implications of eye condition:

General Learning Abilities (Present levels of educational functioning):

Presence of Additional Disabilities

Describe:

Implications:

Access to Instructional Materials—Physical Characteristics

1. Attends to objects (Indicate size/distance.):
2. Identifies object(s) (Indicate size/distance.):
3. Identifies shapes (Pictured): (Indicate size/distance.):
4. Identifies pictures
   (Outline of single item): (Pictured action/activity):
   (Indicate size/distance.):
5. Size of print (Letters/Numbers):
   (Additional low vision aid):
   (Reading distance and posture):
6. Quality of print or picture (Indicate what is seen efficiently compared with what requires time or effort or both.)
   Clarity needed: ☐ Sharp image ☐ Distinct edges ☐ Boldfaced type Other:
   Can see: ☐ Photocopy ☐ Ditto Other:
   Contrast: ☐ Dark ☐ Faded ☐ Light Other:
   Color of print: Color of paper:
   Observations/Comments:

7. Print style or font (Indicate what can be seen.)

   ☐ Bold ☐ Thin ☐ Underlined ☐ Italics Other: _____

   ☐ Serif ☐ Sans serif Other: _____

8. Print spacing (Indicate spacing preference for numbers and letters, words, or lines.)

9. Ability to see and use printed materials in standard format (Check and identify.)

Single shape or object (solid or outline):	
Pictures:	
Textbooks:	
Tests:	Reference (e.g., dictionary):
Measurement tools:	Calculator:
Pictorial: Drawings:	Diagrams:
Computer screen:	Maps:
Other:	

Access to Instruction

1. Instructional Formats That Can Be Seen (Check and identify.)

Demonstration or explanation of objects:			
Explanation of pictured/printed work sheet:			
Overhead:	Colors:	Video:	
Chalk:	Colors:	Dry-erase board:	Colors:
Bulletin board:	Maps:	Charts:	Pocket charts:
Other:			

2. Written Work (Check and identify where applicable.)

Legibility: To student:	To teacher:	To others:	
Writes on line:		Paper used: ☐ Blue lined	☐ Black lined
Uses: ☐ Crayon	☐ Regular pencil	☐ Dark pencil Other:	
Working distance:		Posture:	
Observations/Comments:			

3. Vision-Related Behavior(s)

Searches to localize designated objects:		
Searches to localize a designated place (i.e., finds where to begin; locates a specific section or item):		
Scanning: Looks material over thoroughly:	Determines format:	Uses finger:
Maintains place to copy: At desk:	From the board:	
Is able to follow: Teacher's presentation:	As another student reads:	

Sustains attention with: Without: Apparent fatigue for (subject, time):

Efficiently locates materials:

Observations/Comments:

Social/Emotional Factors (Self-esteem, adjustment/acceptance)

1. Indicates vision-related needs:
2. Indicates needs for assistance:
3. Describes nature/extent of visual impairment:
4. Uses specialized materials or equipment as needed:
5. Other:

Suggested Recommendations (Examples of alternative learning media or interventions or both that reflect vision-related needs resulting from data indicated above)

1. Instructional Modifications (Indicate near and distance.)

   Student is given an item or print copy or both during oral explanation:

   Surface angle (For example, a reading stand):

   Student moves (Name activity.):

   Positioning of material:

   Adjusted time (Amount and activity):

   Adjusted length (Amount and activity):

   Copying: Near: Distance: NCR paper:

   Prompts for attention: Visual: Auditory: Tactual:

   Other:

2. Adaptations to Materials (Indicate what type and when needed.)

   Size:

   Darken: Raised line: Braille:

   Aural media:

   Other:

3. Specialized Materials and Equipment

   Large print (Indicate size/activity.):

   Magnifier (Diopter/Power, activity): Monocular (Power, activity):

   CCTV (Size necessary):

   Voiced equipment: Voiced software:

   Other: